

ABSTRACT

Methods and apparatus for simultaneous vaporization and ionization of a sample in a spectrometer prior to introducing the sample into the drift tube of the analyzer are disclosed. The apparatus includes a vaporization/ionization source having an electrically conductive conduit configured to receive sample particulate which is conveyed to a discharge end of the conduit. Positioned proximate to the discharge end of the conduit is an electrically conductive reference device. The conduit and the reference device act as electrodes and have an electrical potential maintained between them sufficient to cause a corona effect, which will cause at least partial simultaneous ionization and vaporization of the sample particulate. The electrical potential can be maintained to establish a continuous corona, or can be held slightly below the breakdown potential such that arrival of particulate at the point of proximity of the electrodes disrupts the potential, causing arcing and the corona effect. The electrical potential can also be varied to cause periodic arcing between the electrodes such that particulate passing through the arc is simultaneously vaporized and ionized. The invention further includes a spectrometer containing the source. The invention is particularly useful for ion mobility spectrometers and atmospheric pressure ionization mass spectrometers.